

PROJECT NUMBER: 6502  
PROJECT TITLE: Environmental Tobacco Smoke  
PROJECT LEADER: C. E. Thomas  
PERIOD COVERED: July 1988

## I. QUANTITATION OF BENZENE AND TOLUENE IN MS AND SS CIGARETTE SMOKE

- A. **Objective:** Quantify the deliveries of benzene and toluene in MS and SS tobacco smoke of the FTR C20 and C50 Cigarettes.
- B. **Results:** The averaged mainstream and sidestream deliveries of benzene and toluene for the C20 and C50 cigarettes (n=5) are given in the table below:

Sample Type		MS (mg/cig)	SS (mg/cig)	SS (mg/g tobacco)
C20 Cigarette (20% Ventilation)	Benzene	0.05	0.34	0.46
	Toluene	0.10	0.75	1.03
C50 Cigarette (50% Ventilation)	Benzene	0.03	0.32	0.51
	Toluene	0.05	0.72	1.15

- C. **Conclusions:** The differences in the filter ventilation of the two cigarettes had little effect on the SS deliveries of benzene and toluene. The change from 20% ventilation to 50% ventilation however, decreased the MS benzene and toluene deliveries by 50 percent [1]. A memo has recently been issued detailing the procedures for smoke collection and for the gas chromatographic analysis of benzene and toluene. This memo also discusses the benzene and toluene data obtained on the Mg(OH)<sub>2</sub> circumference cigarette models [2].
- D. **Plans:** Benzene and toluene measurements will be performed on selected reference cigarettes in support of the SS program. An HP 5880 gas chromatograph has been obtained and it will be set-up and optimized for the procedure.
- E. **References:**
1. H. Randolph, PM Notebook #8475, p. 157.
  2. H. Randolph, M. Parrish, "MS and SS Benzene and Toluene Deliveries for Cigarette Models With and Without Mg(OH)<sub>2</sub> Paper at 17, 20, and 24.8-mm Circumference.", Memo to R. Fenner, July 15, 1988

## II. AMBIENT MONITORING OF ENVIRONMENTAL TOBACCO SMOKE

- A. **Objective:** To quantify the ambient levels of CO, particulates, and nicotine in environmental spaces using portable monitoring systems.

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- B. Results: Problems with instability of the Neotronics CO sensors have been corrected by replacing the original Neotronics sensors with new sensors by Neotronics and Transducer Research. These new sensors, in a test on the Company Jet, operated normally, and recorded frequent changes in CO concentration during the flight [1].
- C. Conclusions: It is now believed that two distinct effects were the cause of anomalous data from the Neotronics sensors. First, the Neotronics sensors were old. As the sensors aged, the low relative humidity and decreased barometric pressure found in commercial aircraft could have exacerbated the marginal operation of the sensors and resulted in negative data [2].
- D. Plans: All of the Neotronics sensors will be replaced with new sensors on a periodic basis, probably every 6 to 8 months. The tests on board the company aircraft will be repeated with the addition of a second technique for measuring CO. This alternate technique may be a Miran infrared gas analyzer if the sensitivity proves to be adequate. A survey of state-of-the-art technology is being performed in the event the Miran unit can not meet the requirements [3].
- E. References:
1. G. Baker, P.M. Notebook # 8504, pp. 63-66.
  2. E. Thomas, "Status on the Investigation of Monitoring CO on Aircraft using the PASS Units.", Memo to B. Fenner, July 8, 1988.
  3. M. Parrish, P.M. Notebook #8617, p. 66.

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